DRYING

2nd Edition

Fruits & Vegetables

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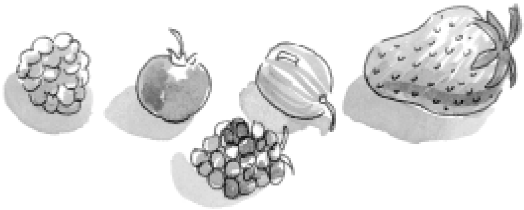

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Cover photo—Dishes prepared from dried fruits and vegetables (top to bottom) are Tangy Golden Fruit Snacks, Dried Vegetable Quick Bread, and Tangy Stewed Fruit.

Introduction

Drying foods yourself allows you to choose the best, tastiest varieties you can buy or pick fresh from the garden. Home drying also lets you enjoy dried fruits and vegetables the grocery stores don't carry. Dried berries make wonderful additions to winter muffins. Dried tomatoes perk up a pot of baked beans. Backpackers let lightweight dried vegetable mixes simmer into tempting soups. And the foods you dry yourself cost a lot less than the ones you buy.

Microorganisms and enzymes that spoil food need water to be active. Drying works as a preservation method simply by depriving them of water.

Unlike canning, in which you follow precise instructions for packaging and processing times to keep the food safe to eat, food drying is flexible. Decisions about food-piece sizes, food mixtures, pretreatments, and packaging are yours. Drying time is determined less by the clock than by simple tests you perform.

Almost any food-safe packaging will do for dried foods. And, unlike canned foods, packages can be opened and closed again and again.

High-quality, moderately priced electric dehydrators are widely available. Easy to use and needing little care, they produce a consistently top-quality product. For these reasons, most people buy or borrow electric dehydrators rather than use their oven or the sun. Whatever drying method you choose, the principles in this guide will apply.

Drying Methods

Foods can be dried in an electric dehydrator, in the sun, in a solar dryer, or in a regular oven.

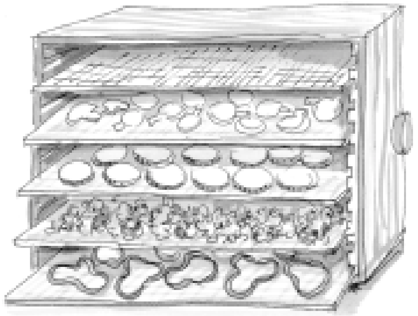
Dehydrator Drying

Dehydrator drying produces the best quality dried products, so it's not surprising that it's also the most popular drying method. Dehydrator drying also gives you greater flexibility than other methods because it does not depend on dry, sunny days or take over your oven. A variety of electric dehydrators are available for purchase. A dehydrator should have a heat source, a thermostat, and some method of air circulation. If you buy a dehydrator, follow the directions that come with it.

Buying a Dehydrator

Before you buy a new or used food dehydrator, check to see that it has all these features:

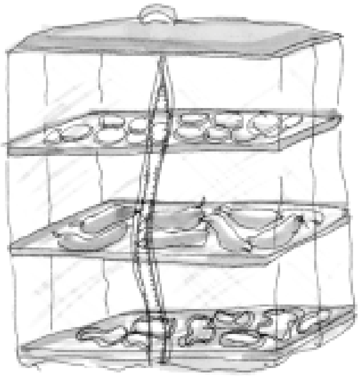
- Instruction manual.
- Thermostatically controlled temperature dial with settings between 130° and 150°F.
  (If you plan to dry meat jerky in your dehydrator, the dehydrator must be capable of maintaining a temperature of 145°. Contact the extension educator in your county for instructions on how to safely prepare meat jerky.)
- Fan or blower to distribute warm air evenly.
- Shelves made of stainless steel or food-grade plastic. (Galvanized screening is not food-safe.)
- Easy loading and unloading features.
- Outside cabinets made of hard plastic, aluminum, or steel. The highest quality dehydrator has double-wall construction with insulating material sandwiched between the walls to reduce the amount of heat lost during use.
- Enclosed heating element.



- Appropriate number of trays for your use. Most food dryers come with 4 to 10 food trays.
- Source of replacement parts.

Sun Drying

Sun drying works best when the temperature is in the 90s, the humidity is low, and air pollution levels are low. A major advantage to sun drying is its low cost. Drying trays, netting to protect against bugs, and food to dry are your only investments.



Sun drying makes you dependent on the weather, however. If it is sunny one day and cloudy the next, you will have to finish drying by another method. That's because spoilage can occur while the drying food still has enough moisture for microbial growth. Also, you should bring the food inside on cool nights. Another disadvantage is time. What dries in 6 to 8 hours in an electric dehydrator may take 2 to 4 days in the sun.

Solar Drying

Solar drying is like sun drying, only better. The sun's rays collect in a solar box so that, compared with sun drying, drying temperature is higher and drying time is shorter. The shorter drying time gives microorganisms less chance to cause spoilage.

If you do not want to buy or build a solar box, you can use the back window ledge of an automobile where the sun shines through. Crack the windows slightly to allow air flow so temperatures do not get too hot. Cover the trays with netting to keep bugs out.

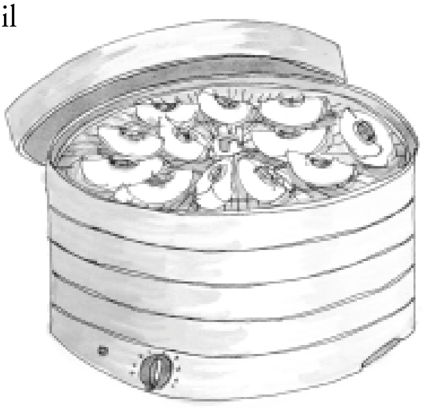
Oven Drying

You can use your oven to dry small amounts of food at one time. You'll have little or no investment in equipment and you won't have to depend on the weather.

Although oven drying produces a safe, generally tasty product, don't expect top quality. Oven-dried food is more brittle and usually darker and less flavorful than food dried in a dehydrator. Another disadvantage of oven drying is its energy cost. Oven drying takes two or three times longer than drying in a dehydrator.

Before drying in an oven, test the oven temperature with an oven thermometer for about 1 hour. Prop open the oven door as you would when actually drying fruit. The oven should maintain a temperature of 130° to 150°F.

If the oven cannot maintain a temperature in this range, you will not have high-quality dried food. If the oven is too hot, your food will begin to cook instead of dry. If it is too cool, your food may not dry fast enough and spoil instead.



Selecting Foods for Drying

Fruits

If you're new to drying, start with the fruits you like best. Think also about how you will use your dried fruits. Peaches or pears in a tangy stewed fruit? Apples or apricots for lunch box snacks? Berries to toss into muffin or cake batters? Most fruits are easy to dry.

High-quality fruits make the best dried products. Choose firm, fully ripe fruit that is heavy for its size. Handle fruits gently and process them immediately because fruit ready for drying is very fragile. Use overripe or bruised fruits in other ways (for example, as fruit leathers).

Vegetables

Vegetables for drying should be fresh, tender, and just mature. Avoid immature vegetables because their color and flavor tend to be weak or poor. Also avoid excessively mature vegetables, which are inclined to be tough, woody, or fibrous. For the best quality and nutrition, dry vegetables as soon as possible after harvest.

Preparing Foods for Drying

For suggestions for specific fruits and vegetables, see the drying guidelines beginning on page 18.

Fruits

Gently wash all fruits in cold water just before drying to remove dirt, bacteria, and insects. Thoroughly wash fruits that have skins you will not peel off, such as cherries and prunes. Do not soak fruit because extended soaking can cause nutrient loss and waterlog the fruit, which increases drying times.

Remove fruit stems and peels. Peels may be left on some fruits, such as apples and peaches, but they may become bitter or discolor during drying. Core or pit the fruit and cut it into uniform halves, quarters, or slices. Trim away diseased or soft spots.

Vegetables

Wash vegetables in cold water just before drying. If vegetables are covered with soil, wash them under clean running water to prevent the dirt from resettling on the food. Do not allow vegetables to soak in water.

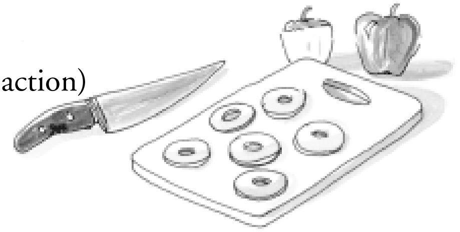
Most vegetables should be peeled and trimmed then cut, sliced, or shredded into uniform pieces. Although peeling some vegetables such as young zucchini and well-washed carrots is optional, unpeeled vegetables tend to be tougher when dried. Remove fibrous or woody portions and damaged areas. You can prepare pieces with a food slicer or food processor.

Pretreating Fruits and Vegetables

See the drying guidelines on pages 18 through 22 for specific details.

Although you can dry and store many foods without pretreatment, pretreatment generally improves quality, particularly for vegetables. Five major reasons for treating foods before drying are to

1. Preserve color and flavor
2. Minimize nutrient loss
3. Stop decomposition (enzyme action)
4. Ensure more even drying
5. Extend storage life



Pretreatment Methods for Fruits and Vegetables

Fruits	**Vegetables**
Ascorbic acid/citric acid dips	Steam blanching
Salt solution dip	Water blanching
Syrup blanching	
Honey dip	
Sulfiting	

Pretreating Fruits

Decomposition from enzyme action during storage is less a problem with fruits than it is with vegetables. Fruits have higher levels of sugar and acid, which counteract enzyme action. Although pretreating fruit is not necessary, you can use an ascorbic acid/citric acid dip, a salt solution dip, syrup blanching, a honey dip, or a sulfiting procedure. Certain fruits, such as apricots, pears, peaches, and some varieties of apples, tend to discolor with drying. Pretreating those fruits can decrease browning during processing and storage and lower losses of flavor and of vitamins A and C.

If you use a pretreatment method that requires soaking fruits in a water solution, you will need to increase drying time because the fruit will absorb some water. Do not allow foods to soak more than 1 hour.

Ascorbic Acid/Citric Acid Dips. Ascorbic acid/citric acid dips are often used as a pretreatment for fruits. They prevent fruits such as apples, pears, peaches, and apricots from turning brown when cut and exposed to air. An ascorbic acid dip also increases the vitamin C content of the dried fruit. (Ascorbic acid is another name for vitamin C.) Use U.S.P. ascorbic acid or food-grade ascorbic acid, which are seasonally available among canning supplies in supermarkets. Vitamin C tablets can also be used.

To prepare an ascorbic acid solution, combine 1/2 teaspoon of ascorbic acid crystals, or three crushed, 500-milligram tablets of vitamin C, with 1 quart water. Stir until the ascorbic acid dissolves. Place the cut fruit in the ascorbic acid solution. Stir the fruit to ensure even coating. Leave the fruit in the ascorbic acid solution for about 5 minutes. Approximately 1 quart of solution will treat 8 cups of fruit.

Pineapple juice or juice from citrus fruits such as oranges, lemons, or grapefruit can also be used as a pretreatment. These juices contain a mixture of citric and ascorbic acids. However, citric acid is a weaker acid than ascorbic acid and is less effective as a pretreatment.

You can also use a commercial pretreatment such as the anti-darkening powders often sold with food preservation supplies. Follow the label directions.

Salt Solution Dip. Prepare a solution of 2 to 4 tablespoons of salt per gallon of water. Soak fruit for 2 to 5 minutes, and then drain it well.

Syrup Blanching. Prepare fruit for drying. Prepare a sugar syrup made with 1 part sugar and 2 parts water. If desired, use less sugar. Bring the syrup solution to a boil. Add the fruit, simmer for 5 minutes, then drain the fruit. Place the fruit on drying trays and dry. This fruit product is like a candied fruit.

Honey Dip. A honey treatment for fruit can effectively minimize browning and softening in light-colored fruit. Prepare a honey-water dip using 1 part honey to 4 parts water. Dip the fruit in the honey solution immediately after slicing, let it soak for about 5 minutes, and drain well. The dried fruit will have a slight honey taste.

Sulfiting. Sulfur dioxide treatments, either sulfiting or sulfuring, are very effective for retarding oxidation and browning in fruit. Fruit flavor and storage life may also improve. Almost all commercially produced light-colored fruits, such as dried apples, pears, and apricots, are treated with sulfur compounds.

However some people have severe allergic responses to sulfur compounds. They should not eat or work with dried fruit pretreated with sulfur or sulfite compounds.

Sulfuring, a complicated and potentially dangerous procedure, is no longer recommended.

Sulfiting involves preparing a solution of water and a sulfiting agent and then soaking the cut fruit in the solution. In the United States six sulfur compounds (sulfur dioxide, sodium sulfite, sodium bisulfite, potassium bisulfite, sodium metabisulfite, and potassium metabisulfite) have been listed by the U.S. Food and Drug Administration (FDA) as "Generally Recognized as Safe" (GRAS). The most popular sulfiting agents for home drying are sodium bisulfite, sodium sulfite, and sodium metabisulfite. They should be either U.S.P. (food grade) or reagent grade (pure). They are available at most wine-making supply centers and some larger supermarkets.

Amount of sulfur to add per quart of water	
Sodium bisulfite	1/2 to 1 teaspoon
Sodium sulfite	1 to 2 teaspoons
Sodium metabisulfite	1 to 3 teaspoons

The sulfiting process has two steps:

1. Prepare the sulfiting solution in a large glass container just before use. Place the cut fruit in the solution. Do not leave the fruit in the sulfiting solution too long or the fruit will be mushy. Use about 10 minutes for sliced fruit and 30 minutes for halved fruit. Do not exceed the recommended quantities of sulfites or soak times.
2. After sulfiting, remove the fruit and drain it well. Some people recommend a quick rinse in cold water before drying. Place sulfited fruit on drying trays and dry. Drying times for sulfited fruits are longer because the fruit absorbs some water during soaking.

Allergic Reactions to Sulfites

Some individuals, particularly those with asthmatic conditions, are highly sensitive to sulfites. During the drying process, most of the sulfites enter the air, leaving only a trace on the fruit. Nevertheless, this trace may cause severe allergic reactions in sensitive individuals. Sensitive individuals should not eat food treated with sulfites or prepare soaking solutions with sulfites. If you use a sulfiting pretreatment when drying foods, be sure to say so on the label.

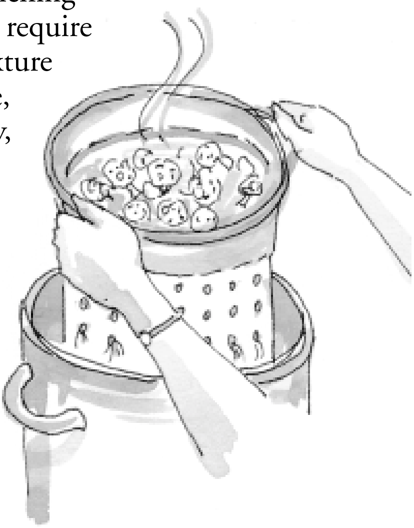
Pretreating Vegetables

Blanching (heating in boiling water or steam) is the pretreatment method of choice for vegetables. Almost all vegetables should be blanched before drying to destroy the enzymes that make vegetables deteriorate. Blanching keeps vegetables from browning, becoming bitter, or developing off flavors. Blanching also cleans and softens vegetables and makes them easier to rehydrate later. Although you can use either boiling water or steam for blanching, vegetables lose more nutrients during boiling.

Steam Blanching. Use a steamer or make a steamer out of a kettle with a tight-fitting lid. Place a colander, wire basket, or sieve inside the kettle. Make sure the food will be above the water level. Add 2 inches of water to the kettle and heat it to boiling. Place the container with the loosely packed food in the steamer, cover the kettle tightly, and continue boiling.

Water Blanching. Fill a kettle with enough water to cover the food. Bring the water to a rolling boil and gradually stir in the food. Cover the kettle tightly and boil. You can reuse the water when blanching more of the same food, adding more water as necessary. If the water appears dirty, replace it with clean water.

Determining Blanching Times. Blanching times vary with altitude (higher altitudes require longer blanching times), the type and texture of the vegetable, the amount of vegetable, and the thickness of the pieces. Generally, vegetables should feel and taste firm yet tender. They should not be fully cooked, but they should be heated all the way through. Test the food by cutting through a piece. If sufficiently blanched, it will appear cooked (translucent) nearly to the center.



The drying guidelines on pages 18-22 suggest blanching times, but you should test the food frequently to avoid over- or underblanching. Underblanching may cause deterioration in storage, poor rehydration, or bad color. Overblanching makes

vegetables lose color, flavor, and nutrients and gives them poor texture after rehydration.

After Blanching. Drain vegetables by pouring them directly on the drying trays. If you plan to reuse the water, place a large pan under the trays. Wipe the bottom of the drying tray with a clean towel to remove excess water. Draining the vegetables on one tray and then transferring them to the drying tray results in unnecessary handling. Immediately transfer the blanched vegetables into the dehydrator so drying can begin while the vegetables are still warm.

Drying Canned Fruits and Frozen Vegetables

Using canned fruits is a quick way to prepare fruit for drying. Drain the syrup, rinse the fruit, and cut it into $^1/_2$-inch slices, if desired, then dry as usual. Drying times will be longer than for fresh fruit because the canned fruit will contain absorbed syrup. Dried canned fruit resembles candied fruit and can be used in similar ways.

Likewise, frozen vegetables can be thawed, drained, and dried. Blanching was taken care of before freezing.

Drying in a Dehydrator

Distribute the food on trays in a single layer. Different foods can be dried at the same time, but try to choose foods that will dry in about the same amount of time. (Dry similarly sized pieces together.) Onions, peppers, and other strong foods tend to flavor other foods, so dry them separately.

Moisture must be removed from the food as quickly as possible at a temperature that does not seriously impair the flavor, texture, or color of the food. If the temperature is too low at the beginning, the food may spoil before it dries. If the temperature is too high, the surface may

harden so that the interior dries much more slowly. Start the dryer at 140° to 150°F, with the exceptions noted in the drying guidelines (page 18). After 2 to 3 three hours, lower the dryer temperature to 130°F to 140°F. Adequate air flow can reduce drying times.

Monitor the drying process. If necessary, rotate the trays to ensure even drying. You may need to stir grated, shredded, or finely cut foods.

Drying Time

Many factors affect drying time, including type of food, size and moisture content of the food pieces, pretreatment method, dryer type, dryer temperature, relative humidity of the air, and amount of air movement in the dryer and in the surroundings. With so many factors at work, it's impossible to give precise drying times.

Generally, you can figure on drying times of 6 to 36 hours for fruit and 3 to 16 hours for vegetables, which take less time due to their lower sugar contents. Check the instructions that come with your dehydrator, and read the general guidelines for drying times for various foods given on pages 18-22. In the end, you need to decide when food is dry.

Vegetables are sufficiently dry when they are brittle or leathery. Leathery vegetables will be pliable and spring back if folded. Brittle vegetables such as corn and peas will shatter when hit with a hammer.

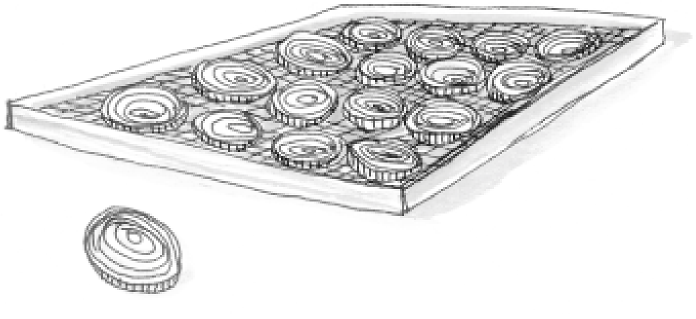
Fruits are sufficiently dry when they are pliable and leatherlike and have no pockets of moisture.

Herbs are sufficiently dry when brittle. Their leaves will shatter when rubbed together.

When you think the food is sufficiently dry, remove a piece and allow it to cool completely. Then check for dryness. (Refer to the drying guidelines on pages 18-22 for specific information.) When you are in doubt about the dryness of a food, continue to dry it. Foods dry more quickly toward the end of the drying period, so check them frequently, and avoid leaving them in the dryer after they are done. Leaving them in will reduce their quality.

Drying for Top Nutrition

- Don't overblanch.
- Dry foods as quickly as possible without raising the temperature above 150°F initially or above 140°F for the remaining drying time. Dry herbs, coconut, and mushrooms at lower temperatures.
- Do not overload the dryer.
- Keep the food on the drying trays well spaced with no overlapping.
- Keep good air circulation to quickly move moisture away from the drying food.
- If possible, dry when the relative humidity is low.
- Check to be sure foods are sufficiently dry.
- Condition dried fruits.
- Store dried foods in packages that do not admit moisture or oxygen.
- Store dried foods in a cool, dark, dry place.
- Store in amounts that can be used easily at one time.



Packaging

Good packaging and storage techniques are crucial. Packaging protects your dried food from oxygen, moisture (gain or loss), light, microorganisms, and pests. After you have checked foods and found them to be thoroughly dry and cool, pack them immediately for storage.

Conditioning Fruits

Some pieces of fruit will be more moist than others after drying so it is a good idea to condition fruits before long-term storage. Conditioning distributes moisture evenly in the fruit. It reduces the chance of spoilage, particularly from mold.

To condition, loosely pack cooled, dried fruit in plastic or glass containers to about two-thirds full. Cover the containers tightly. Shake them daily for about 2 to 4 days. The excess moisture in some pieces will be absorbed by the drier pieces. If you notice water forming on the container lid, place the fruit back in the dehydrator. Because vegetables dry to a nearly waterless state, conditioning vegetables is not necessary.

Choosing Containers

The ideal container for a dried food is:

- Clean and sanitary
- Nontoxic
- Lightweight
- Easily disposable or recyclable
- Moisture resistant
- Airtight
- Protective against light
- Easily opened and closed
- Impermeable to gases and odors
- Durable
- Low-cost

Unfortunately no single food container has all these characteristics. Make your choice based on the type of dried food, your intended storage conditions, and storage time. Three materials—glass, plastics, and metal

(never galvanized steel)—are used for packaging most dried foods. Even open-and-close plastic bags are suitable.

One good method of storing dried food is to place sealed plastic bags inside a larger glass or metal container with a tight-fitting lid. This two-step packaging has the advantages of being relatively easy, allowing more food to be stored in one container, and protecting against insects and other pests. Although you could store more than one type of dried food inside the larger glass or metal container, do not combine foods with strong odors such as onions, cabbage, or broccoli because other dried foods may absorb their odors.

Labeling

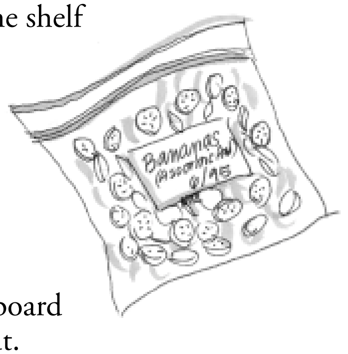
Label each package with the type of food, pretreatment step, and date. Labels may be taped on the outside of a package, tied on with string, or inserted into a clear glass or plastic package. With proper labels you will not have to open individual packages each time you want to use a dried food.

Storage

The length of time you can store dried food depends on

- The type of food
- Factors related to the drying process (pretreatment and final level of moisture in the dried food)
- Packaging of the dried food
- The storage area

An ideal storage area for dried food is cool, dark, and dry. The cooler the storage area, the longer the shelf life. Dark areas are ideal because light fades fruit and vegetables and decreases their vitamin A and C contents.



The storage area need not be fancy; a dark, unheated closet or drawer works fine. Metal containers have the advantage of keeping their contents in darkness. Glass or plastic containers can be covered with a cardboard box, a barrel, or black plastic to keep light out.

Many people store dried foods in the refrigerator or freezer, which keeps quality high.

During storage at room temperature, the most common type of spoilage is mold growth. Molds can grow in foods that are not completely dry and in foods that absorb water when they are packaged or stored in moist conditions. (Remember: don't consume moldy foods. Some toxic molds can grow at room temperature.) Dried food will probably not absorb enough water to allow bacterial or yeast spoilage.

One typical change that occurs during storage is "Maillard browning," which involves complex chemical reactions between the food's sugars and proteins. Other chemical changes that may take place during storage include loss of vitamin C or other nutrients, general discoloration, changes in food structure leading to an inability of the dried food to fully rehydrate, and toughness in the rehydrated cooked product.

Making Fruit Leathers

Fruit leathers are a wonderful way to use small quantities of fruit or extra-ripe fruit. Fruit leathers, also known as fruit paper and fruit taffies, are chewy fruit roll-ups made from either cooked or uncooked fruit purée.

Fruit leathers allow for individual creativity through combinations of different fruits. Generally you can use any kind of fruit, including apples, bananas, berries, grapes, mangos, papayas, peaches, pears, pineapple, plums, and even tomatoes. Citrus fruits alone are generally not recommended. Fruit leathers are an excellent use for slightly overripe or bruised fruit that would otherwise be discarded.

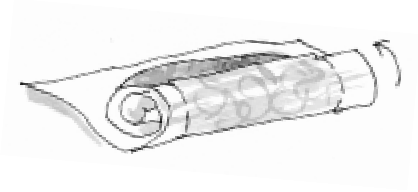
Uncooked Fruit Leathers

1. Select ripe or overripe fruit or fruit combinations.
2. Wash fruit and cut away blemishes. Remove stones or pits. Remove larger seeds from berries, grapes, and tomatoes if you wish. Peel all tough-skinned fruits; peel others if you wish.
3. Cut fruit into chunks and place them in a food chopper, blender, or food processor.
4. Add 1 tablespoon lemon or other citrus juice per quart of yellow or light-colored fruit, if desired, for keeping fruit color.

5. Chop, grind, or blend the fruit into a thick purée. If the fruit has little juice, add several spoonfuls of water or fruit juice to obtain a uniform purée. (If uncooked fruit purée is too juicy, it can be cooked to remove excess liquid.)
6. (Optional) Add sugar, honey, or corn syrup to taste. (Generally no additional sweetener is needed, particularly with ripe fruit, because fruit tastes sweeter after being dried.)
7. (Optional) Add spices (for example, cinnamon, nutmeg, cloves, allspice) to taste. Start with $^1/_2$ teaspoon dried spice per quart of puréed fruit; spice flavors intensify during drying.
8. Use a drying tray designed for fruit leather or line a portion of a drying tray with lightly oiled heavy plastic wrap. Do not completely cover the tray with plastic wrap or the air will be unable to circulate to other trays. Pour a small amount of purée onto the lining wrap. Make sure the tray has an edge to prevent spillage. Tilt the tray until the purée spreads no more than $^1/_4$ inch thick almost to the edge of the plastic wrap. (Two cups of purée will cover a 12- by 17-inch drying tray.)
9. (Optional) Sprinkle the purée with chopped nuts, seeds, or grated coconut.

Cooked Fruit Leathers (Double-Boiler Method)

1. Select, wash, and prepare fruit as described for uncooked fruit leather.
2. Cut the fruit into slices or chunks and place them in the top of a double boiler.
3. Add water to the bottom of the double boiler. Cover the double boiler and steam the fruit for 15 minutes or until fruit is soft. (If a double boiler is not available, you can place a small pan containing the fruit in a larger pan that is partially filled with boiling water.)
4. Follow steps 4-9 for uncooked fruit leather.



Cooked Fruit Leathers (Microwave Method)

1. Select, wash, and prepare fruit as described for uncooked fruit leather.
2. Cut the fruit into slices or chunks and place them in a microwave-safe bowl.
3. Cover the bowl with plastic wrap or a microwave lid.
4. Microwave on high for 4 minutes, stir, and rotate the bowl. Continue stirring and rotating the bowl every 4 minutes until fruit is soft.
5. Follow steps 4-9 for uncooked fruit leather.

Fruit Leather from Canned Fruit

1. Thoroughly drain home-canned or commercially canned fruit or use baby food fruit without tapioca.
2. Follow steps 3 and 5-9 for uncooked fruit leather. Since canned fruits have been heat processed to stop enzymatic action, you don't need to add ascorbic acid.

Drying and Storing Fruit Leathers

Place prepared trays in the dehydrator. Dry until the leather is sticky, generally 6 to 8 hours at 140°F. Properly dried fruit leather will be translucent and slightly tacky to the touch but will still peel away from the plastic wrap.

Lift an edge of the leather, which should stick tightly to the surface, and peel it back slightly. If the leather peels away readily, it is dry. If the leather has cooled, it may need to be warmed slightly for a few minutes to help it peel away. If the fruit leather cracks or chips, it has dried too long, but it is still edible. Remove the remainder of the plastic wrap. If part of the leather is still sticky, you can dry it more without the plastic wrap.

After drying the fruit leather, leave it whole or cut it into pieces. The fruit leather can be rolled and wrapped in plastic wrap or stored flat in sheets with plastic wrap separating each sheet. Place the wrapped pieces in an air-tight container in a cool, dark, dry place. You can also store fruit leather in the refrigerator or freezer.

Drying Guidelines for Fruits

Fruit	*Selection and preparation (thoroughly wash all fruits)*	*Pretreatment*	*Tests for dryness and drying time guidelines**
Apples	Peel (optional) and core. Cut into slices or rings about 1/4-inch thick.	None, ascorbic acid/citric acid dip, syrup blanch, honey dip, or sulfiting	Leathery to crisp; no moist area in center 6-12 hours
Apricots	Cut in half and pit. Fruits dry more rapidly if quartered or sliced.	Ascorbic acid/citric acid dip, syrup blanch, honey dip, or sulfiting	Springy; no moist area in center 24-36 hours for halves
Bananas	Peel and slice 1/4 to 1/2-inch thick, crosswise or lengthwise.	None or ascorbic acid/citric acid dip	Pliable to crisp 8-10 hours
Blueberries/ Huckleberries	Remove stems.	None or dip larger berries in boiling water to crack the skins	Shriveled; leathery 24-36 hours
Cherries	Remove stems. Slice in half and remove pit, or pit and dry whole.	None or sulfiting	Pliable; leathery 24-36 hours
Coconuts	Drain milk. Steam fruit 1 minute to loosen meat or pry meat out with a knife. Trim dark outer skin, and grate meat or slice in chunks.	None	Leathery to crisp Dry at 110°
Cranberries	Remove stems.	Dip in boiling water to crack skins	Shriveled 24-36 hours
Figs	If figs are small or have partly dried on the tree, they may be dried whole. Otherwise, cut in half. Dry with skin-side down.	None, or syrup blanch	Pliable; leathery; slightly sticky; no moist area in center 6-12 hours
Grapes	Select seedless varieties.	Dip in boiling water 30 seconds to crack skins. Plunge in ice water to stop cooking. Drain on paper towels.	Pliable; leathery 12-20 hours

**Drying times are guidelines only. Test food frequently for dryness according to the criteria described in the chart. Cool food before testing.*

Drying Guidelines for Fruits *(cont.)*

Fruit	*Selection and preparation (thoroughly wash all fruits)*	*Pretreatment*	*Tests for dryness and drying time guidelines**
Kiwi fruit	Remove outer skin. Slice 1/4-inch thick	None	Pliable; leathery
Papayas	Cut in half and remove seeds. Peel and slice.	None, or syrup blanch	Pliable; leathery
Peaches	Peel and slice peaches. Fruits dry more rapidly if quartered or sliced.	None, ascorbic acid/citric acid dip, syrup blanch, honey dip, or sulfiting	Pliable; leathery 24-36 hours for halves
Pears	Peel, cut in half lengthwise, and core. Section or slice about 1/4-inch thick.	None, ascorbic acid/citric acid dip, syrup blanch, honey dip, or sulfiting	Pliable; leathery 24-36 hours for halves
Pineapples	Peel and remove thorny eyes; cut into 1/4-inch-thick slices.	None, or syrup blanch	Leathery but not sticky 24-36 hours
Plums	Cut in half and pit. Fruits dry more rapidly if quartered or sliced.	None, or sulfiting for light-colored fruit	Pliable; leathery 24-36 hours for halves
Prunes	Cut in half and pit. Fruits dry more rapidly if quartered or sliced.	None	Pliable; leathery; a handful of properly dried prunes will fall apart after squeezing 24-36 hours for halves
Rhubarb	Cut in 1-inch lengths.	Blanch for 1-2 minutes	Very brittle; tough
Strawberries	Remove stems. Cut strawberries in half. Dry skin-side down.	None	Pliable; leathery

**Drying times are guidelines only. Test food frequently for dryness according to the criteria described in the chart. Cool food before testing.*

Drying Guidelines for Vegetables

Vegetable	*Selection and preparation (thoroughly wash all vegetables)*	*Pretreatment and blanching time guidelines**	*Tests for dryness and drying time guidelines**
Beets	Select small, tender beets of good color and flavor, free from woodiness. Steam or boil until cooked through. Cool, trim off roots and crowns, and peel. Cut into shoestring strips or into slices about 1/4-inch thick.	Steam or boil until tender 25-30 minutes for small beets	Tough; brittle 10-12 hours
Broccoli	Trim and cut as for serving. Quarter stalks lengthwise.	Water or steam blanch 2-3 minutes in water 3-5 minutes in steam	Crisp 12-15 hours
Cabbage	Remove outer leaves, quarter, and core. Cut into shreds about 1/8-inch thick.	Steam blanch 2-3 minutes	Crisp 10-12 hours
Carrots	Select crisp, tender carrots, free from woodiness. Wash; trim off the roots and tops. Cut into slices or strips about 1/4-inch thick.	Steam blanch 3-4 minutes	Tough; brittle 10-12 hours
Cauliflower	Separate into flowerets; cut large ones in half.	Water blanch (add 1 tablespoon vinegar per 1 gallon water) 3-4 minutes	Tough; brittle 12-15 hours
Celery	Strip off leaves; cut stalks into 1/4-inch pieces. Stir occasionally during drying.	Water blanch 30 seconds to 2 minutes	Crisp 10-16 hours
Corn (cut)	Select tender, sweet corn. Husk. Steam on the cob for 5 to 10 minutes, or until milk is set. Cut from cob.	Steam blanch	Crisp; brittle 6-10 hours
Green beans	Remove defective pods. Remove strings if necessary. Split pods lengthwise to hasten drying.	Water or steam blanch 2-3 minutes in water 3-4 minutes in steam	Brittle 8-14 hours

**Blanching and drying times are guidelines only. Test food frequently for dryness according to the criteria described in the chart. Cool food before testing.*

Drying Guidelines for Vegetables *(cont.)*

Vegetable	*Selection and preparation (thoroughly wash all vegetables)*	*Pretreatment and blanching time guidelines**	*Tests for dryness and drying time guidelines**
Mushrooms	Slice off woody stems. Slice, or dry whole if small. Spread not more than 1/2-inch deep on trays.	None	Crisp; brittle Dry at 120°F
Warning: Use only commercially grown mushrooms. Only an expert can differentiate between poisonous and edible varieties.			
Okra	Use young, tender pods only. Cut 1/2-inch crosswise, slice, or split lengthwise. Spread not more than 1/2-inch deep on trays.	Water blanch 2-3 minutes	Tough; brittle 8-10 hours
Onions	Remove outer, discolored layers. Slice 1/4-inch thick or chop.	None	Brittle; light colored; feels like paper 3-9 hours
Parsley and other herbs	No precooking necessary. Hang bunches or whole plants in a dry, warm place to dry. When dry, crush leaves and remove stems. When drying in dehydrator or oven, keep temperatures below 120°F.	None	Brittle Dry at 100°F 1-2 hours in a dehydrator
Parsnips	Select crisp, tender parsnips, free from woodiness. Wash; trim off the roots and tops. Cut into slices or strips about 1/2-inch thick.	Water or steam blanch 2-3 minutes in water 3-5 minutes in steam	Tough; brittle
Peas	Select young, tender peas of a sweet variety. Shell. Stir frequently while drying.	Steam blanch quickly after shelling 2-3 minutes	Hard; wrinkled; shatter when hit with a hammer 8-10 hours
Peppers (green, red, or yellow)	Cut in 1/2-inch strips or rings. Remove seeds and "partitions." Spread rings two layers deep; spread strips not more than 1/2-inch deep.	None, or water or steam blanch 2-3 minutes in water 3-5 minutes in steam	Tough; brittle 8-12 hours

**Blanching and drying times are guidelines only. Test food frequently for dryness according to the criteria described in the chart. Cool food before testing.*

Drying Chart for Vegetables *(cont.)*

Vegetable	*Selection and preparation (thoroughly wash all vegetables)*	*Pretreatment and blanching time guidelines**	*Tests for dryness and drying time guidelines**
Potatoes	Peel; cut into shoestring strips 3/16-inch in cross section or slice about 1/4-inch thick.	Rinse in cold water. Water or steam blanch, and rinse well. 5-6 minutes in water 6-8 minutes in steam	Crisp 8-12 hours
Pumpkin, yellow	Chop into strips about 1-inch wide. Peel off rind; scrape off fiber and seeds. Cut peeled strips into pieces about 1/8-inch thick.	Water or steam blanch until tender 1 minute in water 2-3 minutes in steam	Tough to brittle 10-16 hours
Soybeans	Blanch pods until beans are tender but firm. Shell.	Water or steam blanch	Shatter when hit with a hammer
Spinach and other greens	Select young, tender leaves. Wash. See that leaves do not form wads when placed on trays. Cut large leaves crosswise into several pieces.	Water or steam blanch until wilted	Brittle
Squash (Hubbard or winter types)	Chop into strips about 1-inch wide. Peel off rind; scrape off fiber and seeds. Cut peeled strips into pieces about 1/8-inch thick.	Water or steam blanch until tender 1 minute in water 2-3 minutes in steam	Tough to brittle 10-16 hours
Squash (summer, crookneck, scallop, zucchini, etc.)	Wash, trim, and cut into 1/4-inch-thick slices.	None, or water or steam blanch	Leathery to brittle 10-12 hours
Tomatoes (meaty varieties)	Select tomatoes of good color. Steam or dip in boiling water to loosen skins. Chill in cold water; peel. Cut into sections not more than 3/4-inch wide. Cut small pear or plum tomatoes in half.	None	Leathery to crisp 10-18 hours

**Blanching and drying times are guidelines only. Test food frequently for dryness according to the criteria described in the chart. Cool food before testing.*

Enjoying Dried Foods

You can eat dried fruits plain or mix them with nuts and seeds for a healthy mixed snack. Use chopped dried fruit or whole dried berries or cranberries instead of raisins or nuts in cakes, quick breads, and cookies.

Dried vegetables make excellent additions to homemade soups and stews. Generally you should soak root crops such as beets, carrots, and potatoes before adding them to a soup, stew, or casserole. Most other dried vegetables can be added directly. (You may need to increase cooking time and add extra liquid to be sure the vegetables are tender.) Dried leafy vegetables can be powdered in a blender or food processor then stirred into soups or purées.

To prepare a dried soup mixture, cut fresh vegetables into small pieces then dry them according to the directions for each vegetable. After drying, combine and store them. Cabbage, carrots, celery, corn, onions, and peas make tasty combinations. Rice, dry beans, split peas, and meat stock are usually added at the time of cooking

Plumping and Rehydrating Fruits and Vegetables

Fruits. To plump or soften dried fruit to make it more chewable, cover it with boiling water, let it stand for 5 minutes, and drain.

Vegetables. When you soak or rehydrate dried vegetables, they should plump to nearly the same size they were when fresh. Start with 1½ to 2 cups cold water for each cup of dried vegetable. Keep the vegetables covered with water during soaking by adding more water, if necessary. Rehydrating root vegetables takes about ½ to 2 hours, depending on the size of the pieces.

If you are adding dried vegetables to a soup or stew, don't worry about rehydrating them; just toss them in.

Recipes

Vegetable Soup

Serves 6
4 cups water
3/4 to 1 cup dried vegetables
(green beans, corn, peas, tomatoes, onions, etc.)
2 packages bouillon granules or cubes
Seasonings to taste (herbs, soy sauce, or curry)
Variation: Add 1/2 cup rice, noodles, lentils,
or barley with the other ingredients.

1. Bring water to a boil. Add dried vegetables, bouillon, and seasonings.
2. Simmer about 20 minutes or until vegetables are tender, though chewy. (Freshly dried vegetables will not take as long to reconstitute as those that have been stored for a long time.)
3. Remember to refrigerate leftovers.

Dried Vegetable Quick Bread

Makes 2 loaves
3 cups flour
1 teaspoon ground cinnamon
2 teaspoons baking soda
1/2 teaspoon baking powder
3/4 cup honey
3 beaten eggs
1 cup oil
2 teaspoons vanilla or other flavor extract
2 cups *finely* chopped, rehydrated vegetables
(about 1 1/2 cups dried)
(optional) 1/2 cup raisins or other chopped dried fruit

1. Using equal amounts of dried vegetables and water, cover the vegetables with cool water. Soak for 15 to 60 minutes, until soft. Drain and set aside.
2. Combine flour, cinnamon, baking soda, and baking powder in a large bowl. Set aside.

3. In another bowl, mix the honey, eggs, oil, vanilla flavoring, and 2 cups of the rehydrated vegetables.
4. Pour the honey mixture into the flour mixture. Mix well until the flour is completely moistened.
5. Add raisins or dried fruit, if desired.
6. Pour into two greased and floured 7- by 3-inch loaf pans.
7. Bake at 350°F for about 50 minutes. Test for doneness by inserting a toothpick into the center. If it comes out clean, the loaves are done.

Tangy Golden Fruit Snack

Makes about 36 balls

1/2 cup dried apricots
1/2 cup dried apples
1/2 cup dried peaches
1/2 cup finely grated dried coconut
1/4 cup finely chopped nuts
1 teaspoon finely grated citrus fruit peel (orange, lemon, lime)
1/2 teaspoon cinnamon
1/4 cup honey (you may want to add 1 more tablespoon of honey if you are using a tart juice such as lemon juice)
1/4 cup citrus juice
Powdered sugar, if desired

1. With a food processor or grinder, grind apricots, apples, and peaches into bits about half the size of a raisin or about 1/8 inch in diameter. Place in a medium bowl.
2. Stir in coconut, nuts, citrus peel, and cinnamon.
3. Slightly warm honey and citrus juices. Stir to mix well.
4. Slowly pour the honey mixture over the fruit mixture, stirring until the mixture sticks together evenly.
5. Form into balls 3/4 to 1 inch in diameter (about 1 rounded teaspoon) and place on drying racks.
6. Dry in food dryer until no longer sticky to the touch (2-3 hours).
7. If desired, roll balls in powdered sugar.

Dried Berry Cobbler

Filling

2 cups dried blueberries, cranberries, gooseberries, or other berry
2 cups boiling water
2 tablespoons tapioca
1 to 1 1/2 cups sugar, depending on tartness of berries

1. Pour boiling water over the berries and let them soak for 3 to 4 hours.
2. Place soaked berries and liquid in a shallow baking dish.
3. Combine sugar and tapioca; sprinkle over the berries.
4. Cover the berries with batter (see below), and bake 30 minutes at 400°F.

Batter

1/4 cup butter or margarine
1/2 cup sugar
1 egg, well beaten
1 1/2 cups flour
2 teaspoons baking powder
1/2 teaspoon salt
1/2 cup milk

1. Cream together butter and sugar. Add beaten egg.
2. Thoroughly mix flour, baking powder, and salt.
3. Add the flour mixture to the butter mixture one-half cup at a time, alternately with the milk.

Dried Fruit Rice Pudding

$^{1}/_{4}$ cup uncooked rice
$^{1}/_{2}$ cup sugar
4 cups milk
$^{1}/_{4}$ teaspoon ground ginger
$^{1}/_{4}$ teaspoon salt
$^{3}/_{4}$ cup dried fruit, cut into small pieces (*not* dried bananas)

1. Combine all ingredients in a large casserole.
2. Bake, uncovered, in a 300°F oven for $2^{1}/_{2}$ hours, or until rice is tender, stirring occasionally. Occasional stirring is especially important during the first hour of baking.
3. Cool. Serve cold.

Tangy Stewed Fruit

2 to 3 cups dried fruit such as apples, apricots, cherries, figs, nectarines, peaches, pears, pineapple, cranberries, or prunes
$2^{1}/_{2}$ cups boiling water
1 tablespoon lemon juice
$^{1}/_{2}$ cup orange juice
2 tablespoons sugar
$^{1}/_{2}$ teaspoon cinnamon
$^{1}/_{4}$ cup honey

1. Pour boiling water over dried fruit in a medium saucepan. Let stand to soften 5 to 15 minutes.
2. Add orange and lemon juices. Bring to a boil.
3. Simmer 20 minutes.
4. Stir in sugar, cinnamon, and honey. Mix well.
5. Serve hot or cold.

Questions & Answers

I did not pretreat my pears before drying them. Now they are quite dark in color. Are they safe to eat?

Yes, the pears are still good to eat. Pretreating helps to stop the enzyme action that darkens light-colored fruit. Also, storing your dried fruit at cool temperatures helps to prevent the browning reaction that occurs during prolonged storage.

My dried apples molded. Can they be rescued?

No. Throw them out. The next time you dry fruit, either remove more of the moisture so mold cannot grow or store the dried fruit in the freezer.

My banana chips don't taste like the ones in the store. What can I do?

There are several varieties of banana chips available. Read the ingredients on their labels. Some banana chips are dipped in honey, and some are dipped in granulated sugar, brown sugar, or flavored gelatin. Be sure the bananas you dry are ripe. Some commercial banana chips have been treated to make them crisp, but this isn't possible to do at home.

What can I do about insects that may have contaminated my sun-dried vegetables?

To kill any insects or insect eggs that may have contaminated foods left to dry in the sun, place the packaged dried foods into your home freezer at 0°F for 48 hours. Or, pasteurize them for 30 minutes without packaging in a 150°F oven.

Store-bought dried fruits are softer and moister than mine. How can I achieve this at home?

Commercially prepared fruits do have a higher moisture content, but they also contain preservatives to prevent mold growth at room temperature. If you want to slightly underdry your fruits to keep them soft, plan to store them in the freezer.

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